

STEREO POWER AMPLIFIER

# KAC-1023

## SERVICE MANUAL

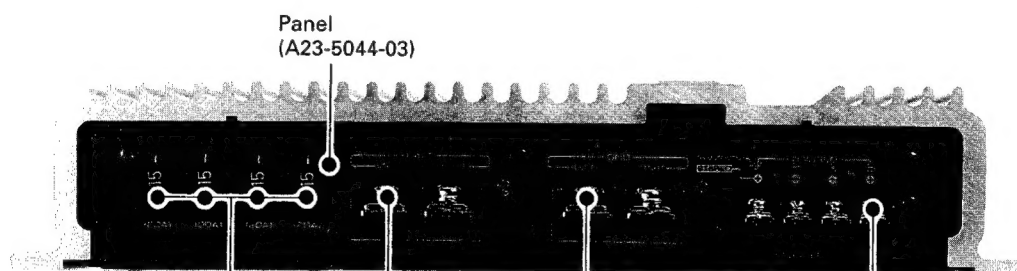
# KENWOOD

© 1992-2 PRINTED IN JAPAN  
B51-6413-00(O)3677



Badge  
(B43-1205-04)

Heat sink  
(F01-1379-01)

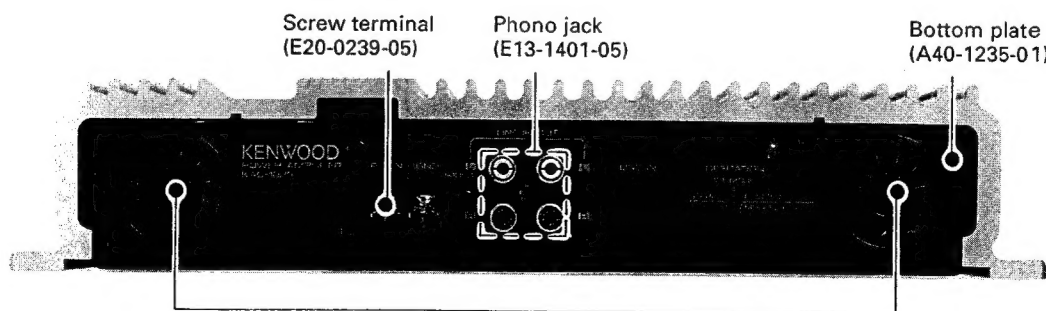


Panel  
(A23-5044-03)

Fuse  
(F05-1537-05)

Screw terminal  
(E70-0804-05)

Screw terminal  
(E20-0479-05)



Screw terminal  
(E20-0239-05)

Phono jack  
(E13-1401-05)

Bottom plate  
(A40-1235-01)

Escutcheon  
(B07-2028-04)

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## CIRCUIT DESCRIPTION

## 1. Description of components

## 1-1. Power supply unit (X00-273X-XX 0-10 : K,M 2-71 : E)

Ref. No.	Use/Function	Operation/Condition/Compatibility
IC1, 2	Pulse generator ICs	Generate pulse for DC/DC.
IC3	Protection IC	Performs muting when power is turned ON/OFF. Detection of DC leakage to speaker terminals, detection of DC in case of input grounding failure, muting in ASO detection, relay control and turning two-color LED ON/OFF. The controls above are performed when TH1 detects choke coil temperature (120°C) or sub-heat-sink temperature (100°C).
Q1, 2	Bias	Temperature compensation of final transistor.
Q3~14	Cascode bootstrap	VIG circuit.
Q15~18	Driver	Final transistor driver.
Q19~26	Power final stage	
Q27, 28	ASO detector	
Q29~40	Switching	DC/DC driver circuit.
Q41~56	Switching	DC/DC power stage.
Q57~60	Switching	P-CON detection.
Q61	Switching	Transfers ASO detection signal to IC3.
Q62	Constant current circuit	Drives power relay.
Q63, 64	Switching	TH3 detects 60°C and turns ON the fan.

## 1-2. Power amplifier unit (X07-271X-XX 0-10 : K,M 2-71 : E)

Ref. No.	Use/Function	Operation/Condition/Compatibility
IC1, 2 1/2	Input buffer	Boosts input signal by +10dB and performs balanced transmission.
IC1, 2 2/2	Input buffer inversion stage	Inverts input signal and performs balanced transmission.
IC3	Isolation amp	
IC4	Inverter IC for BTL	
IC5	LPF	For sub-woofer.
IC7, 8	Class A first stage	
Q1, 2	Input MUTE	Main amplifier input muting transistors.
Q3~6	Class A first stage	
Q7~10	Class A second stage	
Q11, 12	Class A cascode	
Q13~16	Class A third stage	
Q17, 18	Class A current mirror	
Q19~22	Constant voltage circuit	For class A control.
Q23, 24	Constant current circuit	Class A ripple elimination circuit.
Q25, 26	Constant current circuit	For class A first stage.
Q27~30	Constant voltage circuit	For balance, ISO, sub-woofer and inverter.
Q31, 32	MUTE driver	Turn muting ON/OFF.
Q33, 34	LED ON/OFF	Green with Q34 ON, then red if Q33 also goes ON.

## CIRCUIT DESCRIPTION

## 2. Two-color LED

## 2-1. Basic operation

- ON operations

Green LED lights when P-CON is turned ON.

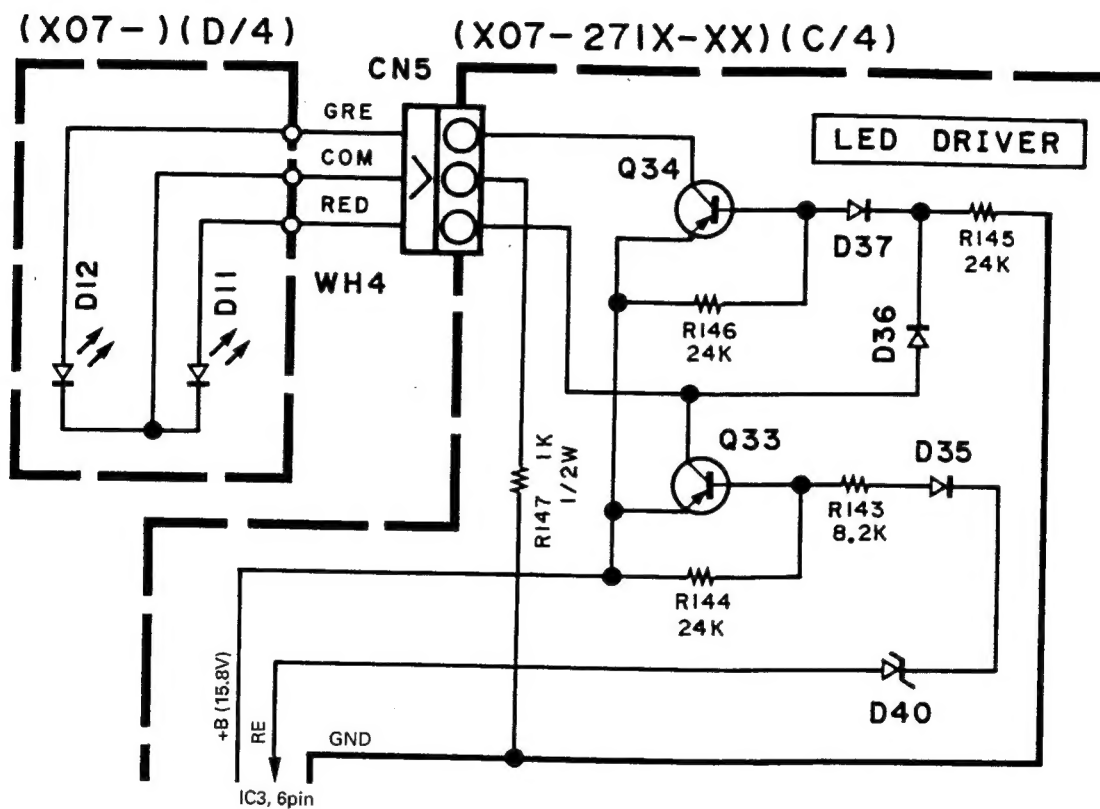
Red LED lights at the same time as relay ON.

- OFF operations

While P-CON is turned OFF, green LED lights at the same time as relay OFF. The LEDs are OFF in other cases.

## 2-2. Operation principle

When P-CON is turned ON, DC/DC is activated, turning Q34 (X07) ON via +15.8V AVR (X07, Q27) and lighting D12 (Green) (X07). Then, pin 6 of IC3 (X00) goes Low (0.7V), turning the relay ON and Q33 (X07) ON, also lighting D11 (Red) (X07) while inhibiting Q34 (X07). During operation of protection function (ASO. DC leakage or thermal protection), when pin 6 of IC3 (X00) repeats Low (0.7V) and High (10V), the lighting of Red/Green is also repeated at the same time as the relay ON/OFF.



## CIRCUIT DESCRIPTION

## 3. DC/DC circuit with PWM (K type 0-10 only)

## 3-1. Basic operation

This circuit detects the voltage of the secondary side of DC/DC (after rectification and smoothing), that is, main amplifier power supply voltage, and controls the switching pulse duration of DC/DC to make the power supply voltage constant regardless of battery voltage and load variations.

## 3-2. Operation principle

First, let us consider about the variation of the voltage input to DC/DC, BATT (Refer to Fig.1).

There is the following relationship

$$+B (-B) = n_2 / n_1 \cdot BATT \cdot TON / T$$

Assuming that the variation of BATT is  $\Delta BATT$ ,  $+B (-B)$  can be a constant voltage by varying the pulse duration according to  $\Delta BATT$  as shown below

$$\Delta TON \propto \Delta BATT / BATT \cdot TON$$

When  $+B (-B)$  varies due to a load condition change (ex

: small power/large power, etc.),  $+B (-B)$  can be made a constant voltage by varying  $TON$  according to the change.

For the detection (Fig.1), it is usually only on the NFB (+) side. By detecting the variation of  $+B$  ( $\Delta V_{SENSE}$ ) with the error amp, the PWM comparator of the next stage is controlled to control the output pulse duration by varying the sawtooth wave slicing level in terms of DC (internal operation of IC). The operations above allow to control  $TON$  so that  $+B$  is constant with respect to the variations of  $+B$ .

However, as this power is supplied to the audio amp circuitry, the variations of  $+B$  and  $-B$  are not always identical, making it also necessary to detect  $-B$ . When we take NFB (-) in consideration, the variation component of  $-B$  with respect to  $V_{REF}$  of the error amp is transferred by  $C1$  and  $R5$  (Fig.1), the voltage of  $-B$  is also detected, and  $TON$  is controlled accordingly.

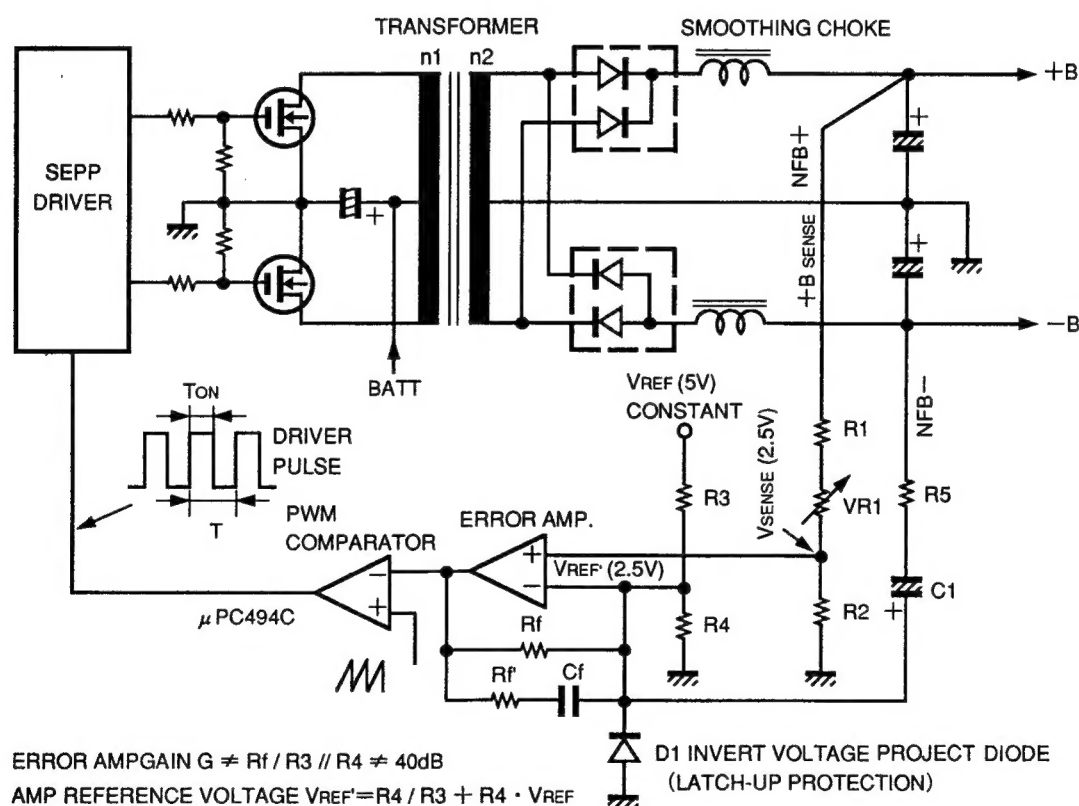
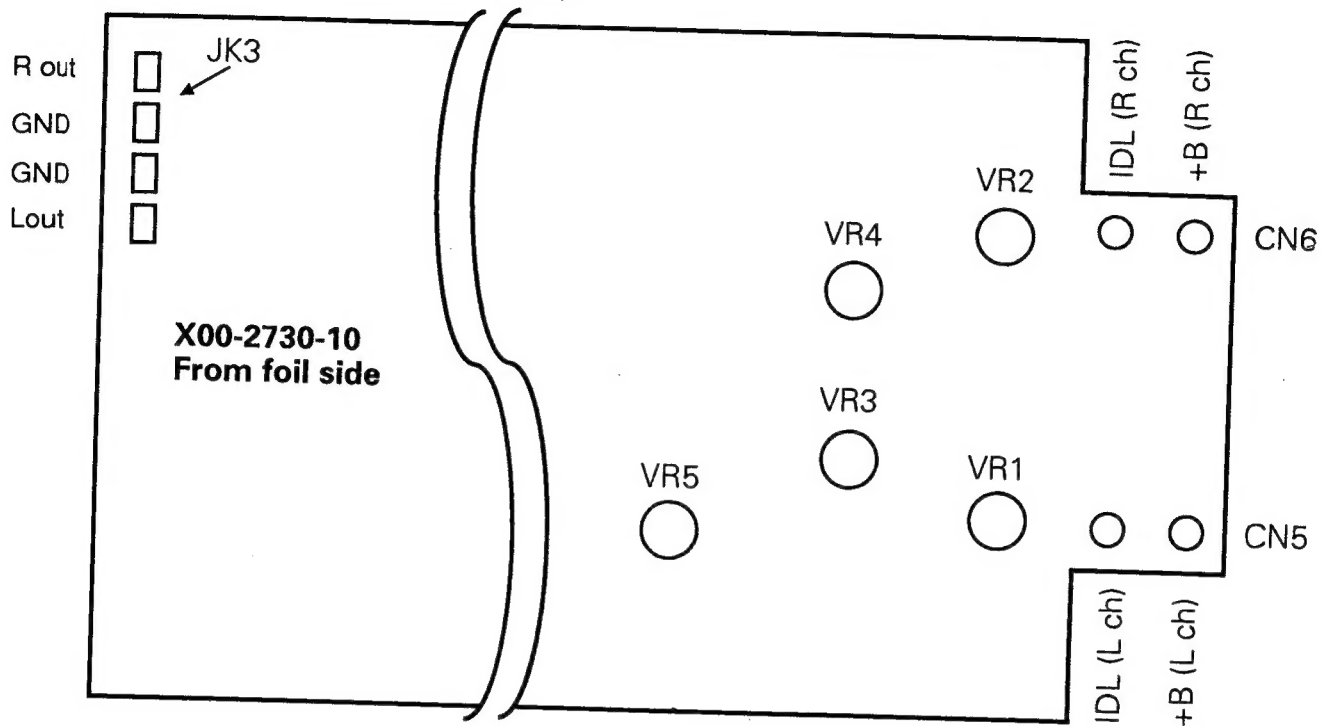


Fig.1

# KAC-1023

## ADJUSTMENT



- (1) Idling adjustment (no-signal current)
  - Adjust VR1 so that the voltage across IDL (L CH) of CN5 and LOUT of JK3 is 3mV.
  - Adjust VR2 so that the voltage across IDL (R CH) of CN6 and ROUT of JK3 is 3mV.
- (2) Voltage adjustment (0-10 destination only)
  - Adjust VR3 so that the voltage across +B (L CH) of CN5 and GND is 51.5V.
  - Adjust VR4 so that the voltage across +B (R CH) of CN6 and GND is 51.5V.
- (3) DC/DC frequency variation
  - The adjustment is normally not necessary. Use VR5 only as occasion calls.





2  
3  
4  
5  
6  
7



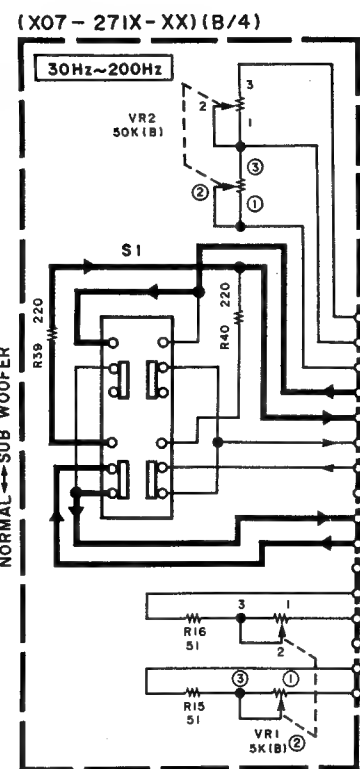
4



6







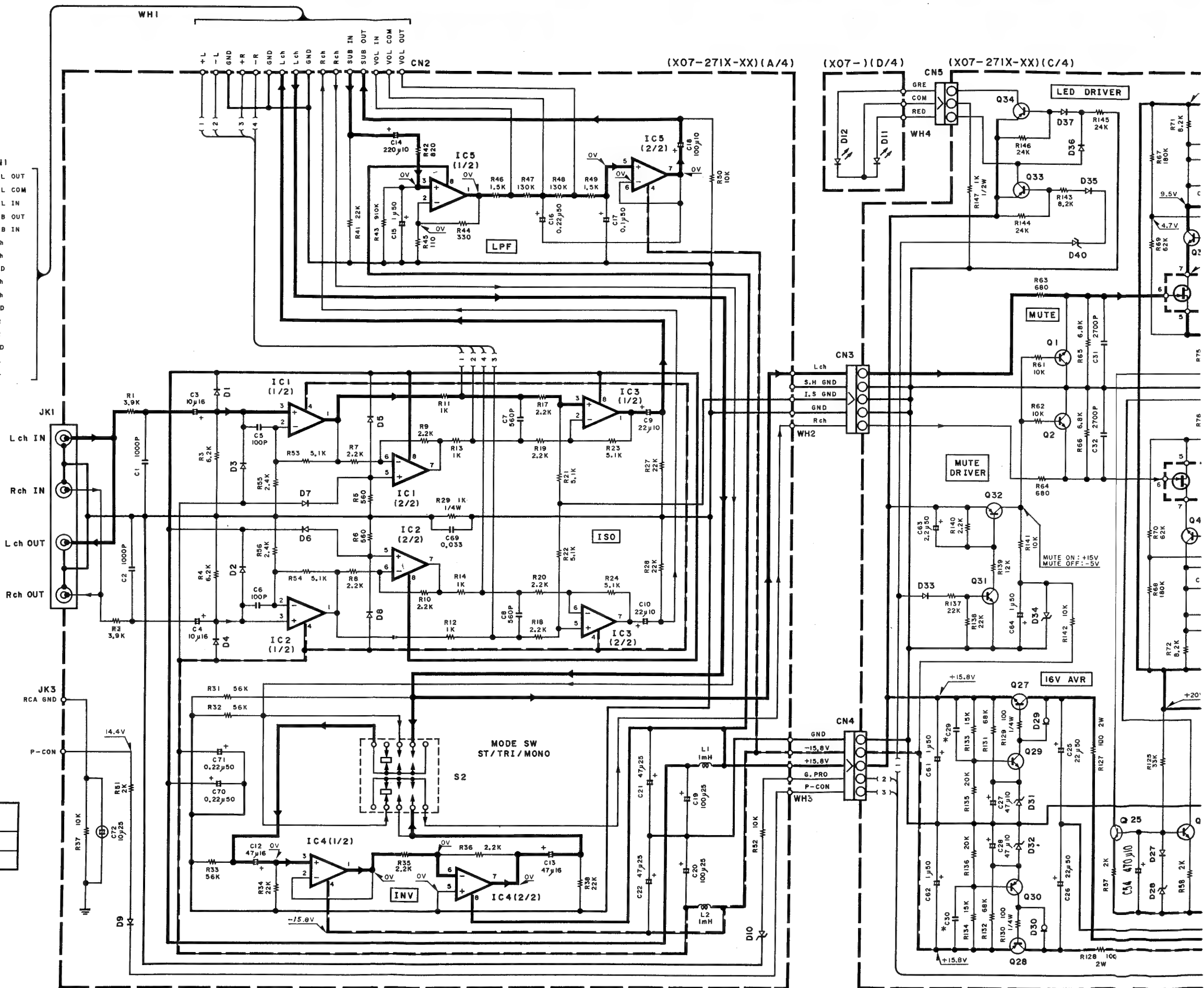
— SIGNAL LINE  
— GND LINE  
— +B LINE  
- - -B LINE

IC1-3 : NJM5532D-D  
IC4,5 : NJM4565D-D  
IC7,8 :  $\mu$ PA68H

Q1,2 : 2SD1302(S)  
Q3-6,25,26,29,31 : 2SC945(A)(Q,P)  
Q7-10,30,32-34 : 2SA733(A)(Q,P)  
Q11-16,24 : 2SC2632(Q,R)  
Q17,18 : 2SA1124(Q,R)  
Q19,27 : 2SD1266BD  
Q20,28 : 2SB941BD  
Q21 : 2SC1845(F,E)  
Q22 : 2SA992(F,E)  
Q23 : 2SA1110(Q,R)

D1-9,13-18,27,33,35-37 : 1SS176  
D10,28,34 : RD5.1JS(B2)  
D11 : B30-1369-05  
D12 : B30-1370-05  
D19,20,24,29,30 : E-152  
D21-23,31,32,40 : RD8.2JS(B2)  
D25,26 : RD20JS(B)

DESTINATION	Ref.No.	R111 112	C29 30
0-10	K,M	270 2W	0.01
2-71	E	10 2W	0.1

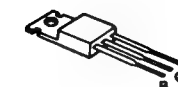
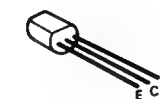




2SA1123 2SC1845  
 2SA1124 2SC2631  
 2SA1315 2SC2632  
 2SA1534A 2SC3940A  
 2SA733 (A) 2SC945 (A)  
 2SA992 2SD1302

2SA1110

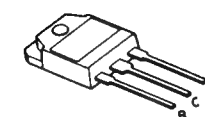
2SB941BD



2SA1303\*5  
 2SC3284\*5

2SC3419

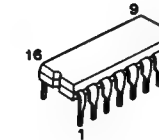
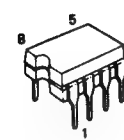
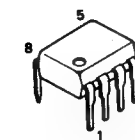
2SA1535A  
 2SC3944A  
 2SD1266BD



NJM5532D-D

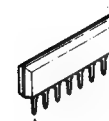
NJM4565D-D

UPC494C



UPC1237HA

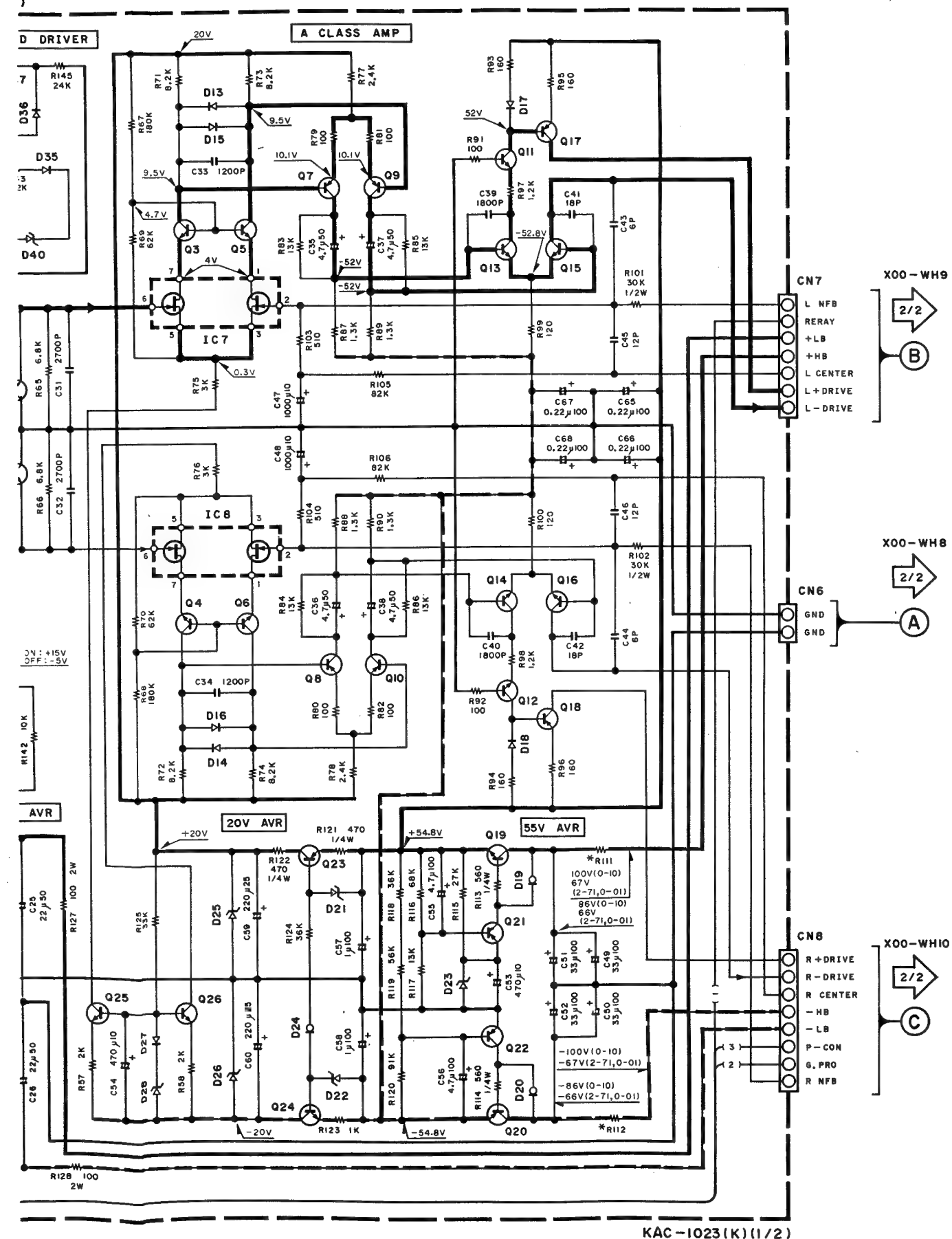
UPA68H



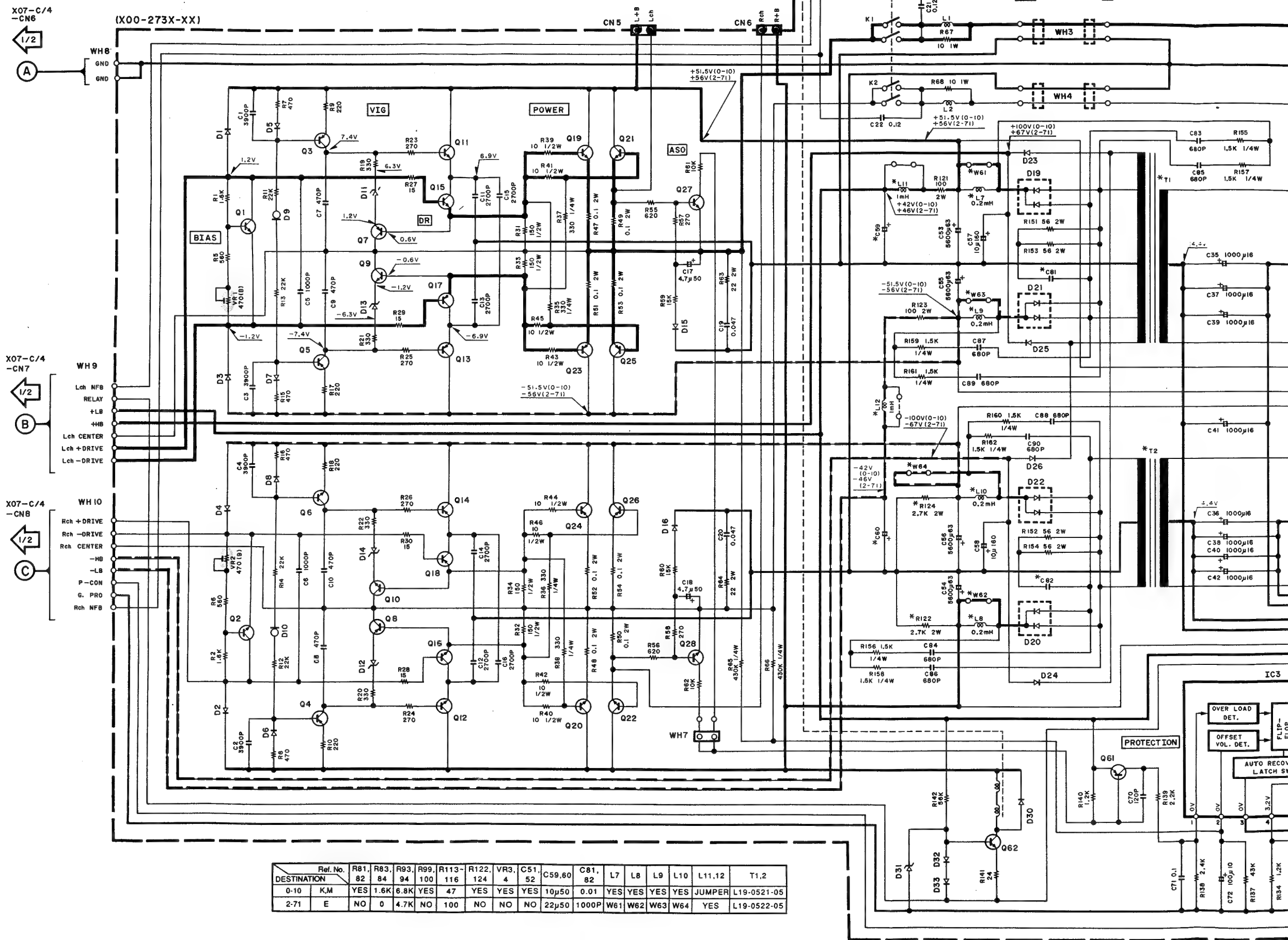
• DC voltages are as measured with a high impedance voltmeter. Values may vary slightly due to variations between individual instruments or/and units.

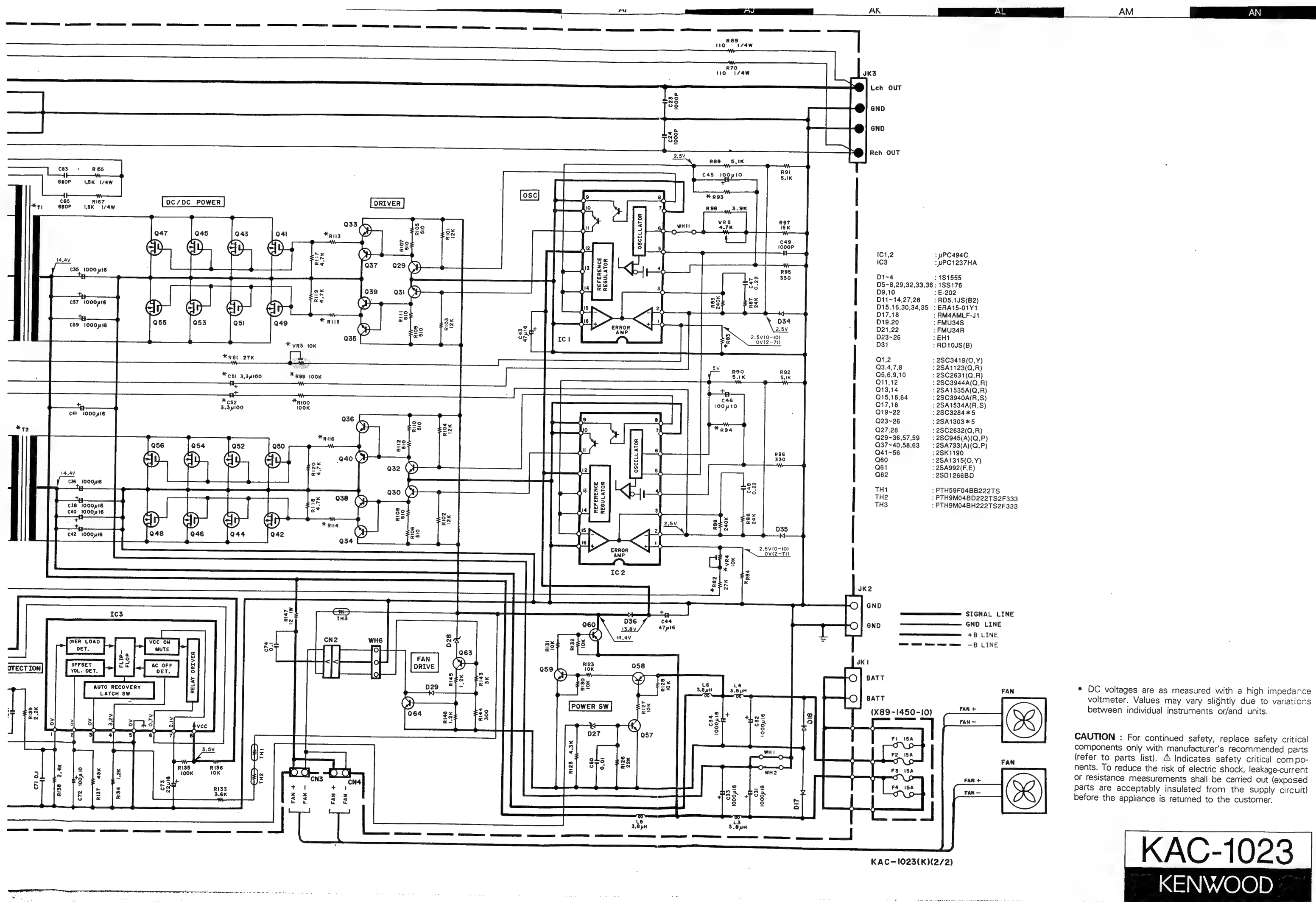
**CAUTION :** For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list).  $\Delta$  Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

**KAC-1023**  
**KENWOOD**

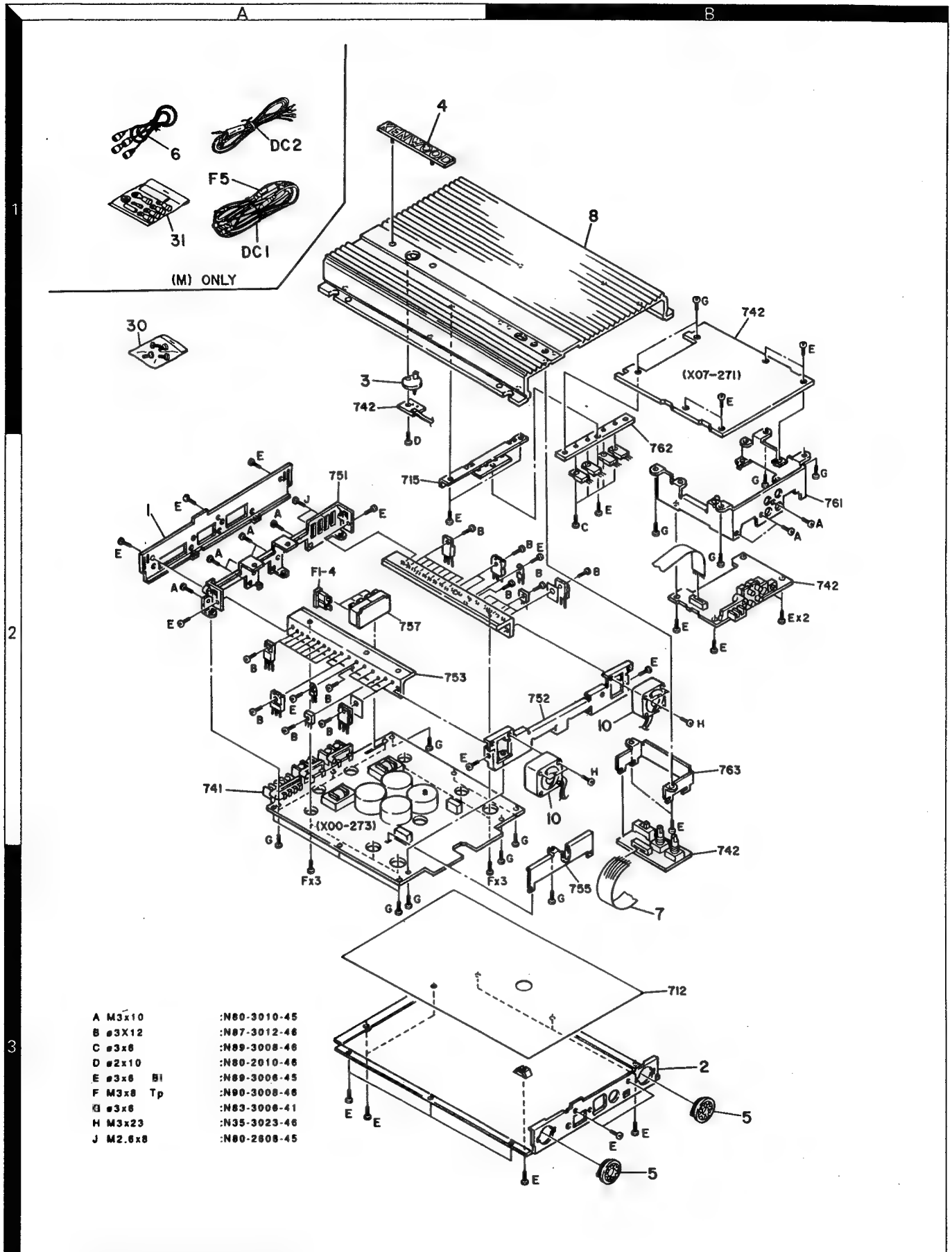


KAC-1023 (K) (1/2)





## EXPLODED VIEW



## PARTS LIST

\* New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕 向	Re- marks 備考
<b>KAC-1023</b>						
1	2A	*	A23-5044-03	PANEL		
2	3B	*	A40-1235-01	BOTTOM PLATE		
3	1A	*	B19-0886-04	LIGHTING BOARD		
4	1A	*	B43-1205-04	KENWOOD BADGE		
5	3B	*	B07-2028-04	ESCUTCHEON		
-			B44-6006-04	POS LABEL		
-			B46-0100-20	WARRANTY CARD		
-		*	B59-0706-00	SUB-INSTRUCTION MANUAL	M	
-		*	B64-0165-00	INSTRUCTION MANUAL	KM	
-		*	B64-0166-00	INSTRUCTION MANUAL	E	
6	1A		E30-3839-05	AUDIO CORD	M	
7	3B	*	E31-8297-05	FLAT CABLE		
DC1	1A		E30-2334-05	DC CORD ASSY	M	
DC2	1A		E30-3583-05	DC CORD	M	
8	1B	*	F01-1379-01	HEAT SINK		
10	2B		F09-1208-05	FAN		
F5	1A		F05-3631-08	FUSE (UL)	M	
F1-4	2A		F05-1537-05	FUSE (15A)		
-		*	H01-9399-04	ITEM CARTON CASE		
-		*	H10-4409-02	POLYSTYRENE FOAMED FIXTURE		
-			H25-0223-04	PROTECTION BAG (750X350X0.03)		
-			H25-0336-04	PROTECTION BAG (170X250X0.03)		
30	1A	*	N99-1577-05	SCREW SET		
D	1A		N80-2010-46	PAN HEAD TAPTITE SCREW		
E	2B, 3B		N89-3006-45	BINDING HEAD TAPTITE SCREW		
F	1B		N90-3008-46	TP HEAD MACHINE SCREW		
H	2B		N35-3023-46	BINDING HEAD MACHIN SCREW		
31	1A	*	W01-0717-05	ACCESSORY	M	
<b>POWER SUPPLY (X00-273X-XX) 0-10 : K, M 2-71 : E</b>						
C1 -4			CF92FV1H392J	MF 3900PF J		
C5 ,6			CF92FV1H102J	MF 1000PF J		
C7 -10			CK45FB1H471K	CERAMIC 470PF K		
C11 -16			CF92FV1H272J	MF 2700PF J		
C17			CE04DW1H4R7M	ELECTRO 4.7UF 50WV		
C18			CE04DW1H4R7M	ELECTRO 4.7UF 50WV		
C19			CF92FV1H473J	MF 0.047UF J		
C20			CF92V1H473J	MF 0.047UF J		
C21 ,22			CF92V1H124J	MF 0.12UF J		
C23			CF92V1H102J	MF 1000PF J		
C24			CF92FV1H102J	MF 1000PF J		
C31 -42		*	C90-2660-05	ELECTRO 1000UF 16WV		
C43			CE04DW1C470M	ELECTRO 47UF 16WV		
C44			CE04DW1C470M	ELECTRO 47UF 16WV		
C45 ,46			CE04DW1A101M	ELECTRO 100UF 10WV		
C47 ,48			CF92V1H224J	MF 0.22UF J		
C49			CF92FV1H102J	MF 1000PF J		
C50			CF92FV1H103J	MF 0.010UF J		
C51 ,52		*	CE04DW2A3R3M	ELECTRO 3.3UF 100WV	KM	
C53 -56		*	C90-2659-05	ELECTRO 5600UF 63WV		
C57 ,58		*	C90-2661-05	ELECTRO 10UF 160WV		
C59 ,60			CE04DW1H100M	ELECTRO 10UF 50WV	K	

E: Scandinavia &amp; Europe K: USA P: Canada W: Europe

U: PX(Far East, Hawaii) T: England M: Other Areas

UE: AAFES(Europe) X: Australia

⚠ indicates safety critical components.



## PARTS LIST

\* New Parts

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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
C59 ,60 C70 C71 C72 C73			CE04DW1H220M CC45FSL1H121J CF92V1H104J CE04DW1A101M CE04DW1C220M	ELECTRO 22UF 50WV CERAMIC 120PF J MF 0.10UF J ELECTRO 100UF 10WV ELECTRO 22UF 16WV	E	
C74 C81 ,82 C81 ,82 C83 -90			CF92FV1H104J CK45E2H103P CQ93HP2A102J CQ93HP2A681J	MF 0.10UF J CERAMIC 0.010UF P MYLAR 1000PF J MYLAR 680PF J	KM E	
JK1 ,2 JK3		*	E70-0804-05 E20-0479-05	SCREW TERMINAL BOARD SCREW TERMINAL BOARD(4P)		
LH1 ,2			J19-2826-05	HOLDER		
L1 ,2 L3 -6 L7 -10 T1 ,2 T1 ,2			L39-0157-05 L33-0331-05 L33-0989-05 L19-0521-05 L19-0522-05	PHASE-COMPENSATION COIL CHOKE COIL CHOKE COIL TRANSFORMER FOR CONVERTER TRANSFORMER FOR CONVERTER	KM KM E	
A B E G J	2A 2A 2A 2A 2A	*	N80-3010-45 N87-3012-46 N89-3006-45 N83-3006-41 N80-2608-45	PAN HEAD TAPTITE SCREW BRAZIER HEAD TAPTITE SCREW BINDING HEAD TAPTITE SCREW PAN HEAD TAPTITE SCREW PAN HEAD TAPTITE SCREW		
R31 -34 R39 -46 R47 -54 R63 ,64 R67 ,68			RD14DB2H151J RD14DB2H100J R92-0205-05 RS14KB3D220J RS14KB3A100J	SMALL-RD 150 J 1/2W SMALL-RD 10 J 1/2W METAL-PLATE 0.1 K 2W FL-PROOF RS 22 J 2W FL-PROOF RS 10 J 1W		
R121 R122 R123 R124 R147			RS14KB3D101J RS14KB3D272J RS14KB3D101J RS14KB3D272J RS14DB3A120J	FL-PROOF RS 100 J 2W FL-PROOF RS 2.7K J 2W FL-PROOF RS 100 J 2W FL-PROOF RS 2.7K J 2W FL-PROOF RS 12 J 1W	KM KM	
R151-154 VR1 ,2 VR3 ,4 VR5			RS14KB3D560J R12-0094-05 R12-3096-05 R12-1069-05	FL-PROOF RS 56 J 2W TRIMMING POT.(470) TRIMMING POT.(10K) TRIMMING POT.(4.7K)	KM	
K1 ,2		*	S76-0804-05	MAGNETIC RELAY		
D1 -4 D5 -8 D9 ,10 D11 -14 D15 ,16			1S1555 1SS176 E-202 RD5.1JS(B2) ERA15-01Y1	DIODE DIODE CONSTANT CURRENT DIODE ZENER DIODE DIODE		
D17 ,18 D19 ,20 D21 ,22 D23 -26 D27 ,28		*	RM4AMLF-J1 FMU34S FMU34R EH1 RD5.1JS(B2)	DIODE DIODE DIODE DIODE ZENER DIODE		
D29 D30 D31 D32 ,33 D34 ,35			1SS176 ERA15-01Y1 RD10JS(B) 1SS176 ERA15-01Y1	DIODE DIODE ZENER DIODE DIODE DIODE	KM	

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D36 IC1 ,2 IC3 Q1 ,2 Q3 ,4			1SS176 UPC494C UPC1237HA 2SC3419(Y) 2SA1123(Q,R)	DIODE IC(SWITCHING REGULATOR) IC(POWER AMP) TRANSISTOR TRANSISTOR		
Q5 ,6 Q7 ,8 Q9 ,10 Q11 ,12 Q13 ,14			2SC2631(Q,R) 2SA1123(Q,R) 2SC2631(Q,R) 2SC3944A(Q,R) 2SA1535A(Q,R)	TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR		
Q15 ,16 Q17 ,18 Q19 -22 Q23 -26 Q27 ,28			2SC3940A(R,S) 2SA1534A(R,S) 2SC3284*5 2SA1303*5 2SC2632(Q,R,S)	TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR		
Q29 -36 Q37 -40 Q41 -56 Q57 Q58		*	2SC945(A)(Q,P) 2SA733(A)(Q,P) 2SK1190 2SC945(A)(Q,P) 2SA733(A)(Q,P)	TRANSISTOR TRANSISTOR FET TRANSISTOR TRANSISTOR		
Q59 Q60 Q61 Q62 Q63			2SC945(A)(Q,P) 2SA1315 2SA992(F,E) 2SD1266BD 2SA733(A)(Q,P)	TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR		
Q64 TH1 TH2 TH3		*	2SC3940A(R,S) PTH59F04BB222TS PTH9M04BD222T PTH9M04BH222T	TRANSISTOR POSITIVE RESISTOR POSITIVE RESISTOR POSITIVE RESISTOR		
<b>POWER AMP (X07-271X-XX) 0-10 : K, M 2-71 : E</b>						
D11 D12		*	B30-1369-05 B30-1370-05	LED LED		
C1 ,2 C3 ,4 C5 ,6 C7 ,8 C9 ,10		*	CF92FV1H102J CE04DW1C100M CK45FB1H101K CK45FB1H561K CE04DW1C470M	MF ELECTRO CERAMIC CERAMIC ELECTRO	1000PF 10UF 100PF 560PF 47UF	J 16WV K K 16WV
C12 ,13 C14 C15 C16 C17			CE04DW1C470M CE04DW1A221M CE04DW1H010M CE04DW1HR22M CE04DW1HOR1M	ELECTRO ELECTRO ELECTRO ELECTRO ELECTRO	47UF 220UF 1.0UF 0.22UF 0.1UF	16WV 10WV 50WV 50WV 50WV
C18 C19 ,20 C21 ,22 C25 ,26 C27 ,28			CE04DW1A101M CE04DW1E101M CE04DW1E470M CE04DW1H220M CE04DW1A470M	ELECTRO ELECTRO ELECTRO ELECTRO ELECTRO	100UF 100UF 47UF 22UF 47UF	10WV 25WV 25WV 50WV 10WV
C29 ,30 C29 ,30 C31 ,32 C33 ,34 C35 -38			CF92FV1H103J CF92FV1H104J CF92FV1H272J CF92FV1H122J CE04KW1H4R7M	MF MF MF MF ELECTRO	0.010UF 0.10UF 2700PF 1200PF 4.7UF	J J J J 50WV
C39 ,40 C41 ,42			CF92FV1H182J CC45FSL1H180J	MF CERAMIC	1800PF 18PF	J J

**E:** Scandinavia & Europe    **K:** USA    **P:** Canada    **W:** Europe

**U:** PX(Far East, Hawaii)    **T:** England    **M:** Other Areas

**UE : AAFES(Europe)      X: Australia**

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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
C43 ,44 C45 ,46 C47 ,48 C49 -52 C53 ,54		*	CC45FSL1H060D CC45FSL1H120J C90-1643-05 CE04DW2A330M CE04KW1A471M	CERAMIC 6.0PF D CERAMIC 12PF J ELECTRO 1000UF 6.3WV ELECTRO 33UF 100WV ELECTRO 470UF 10WV		
C55 ,56 C57 ,58 C59 ,60 C61 ,62 C63			CE04DW2A4R7M CE04DW2A010M CE04KW1E221M CE04DW1H010M CE04DW1H2R2M	ELECTRO 4.7UF 100WV ELECTRO 1.0UF 100WV ELECTRO 220UF 25WV ELECTRO 1.0UF 50WV ELECTRO 2.2UF 50WV		
C64 C65 -68 C69 C70 ,71 C72		*	CE04DW1H010M CE04DW2AR22M CF92FV1H333J CE04DW1HR22M CE04BW1E100M	ELECTRO 1.0UF 50WV ELECTRO 0.22UF 100WV MF 0.033UF J ELECTRO 0.22UF 50WV NP-ELEC 10UF 25WV		
JK1 JK3		*	E13-1401-05 E20-0239-05	PHONE JACK SCREW TERMINAL BOARD(2P)		
L1 ,2			L40-1021-14	SMALL FIXED INDUCTOR(1MH)		
A C G	2B 2B 2B	*	N80-3010-45 N89-3008-46 N83-3006-41	PAN HEAD TAPTITE SCREW BINDING HEAD TAPTITE SCREW PAN HEAD TAPTITE SCREW		
R7 -10 R11 -14 R17 -20 R21 -24 R101,102		*	R92-2102-05 R92-2101-05 R92-2102-05 R92-2103-05 R92-2010-05	METAL FILM 2.2K D 1/6W METAL FILM 1K D 1/6W METAL FILM 2.2K D 1/6W METAL FILM 5.1K D 1/6W CARBON FILM 330K J 1/2W		
R111,112 R111,112 R127,128 R147 VR1			RS14KB3D100J RS14KB3D271J RS14KB3D101J RD14DB2H102J R10-2622-05	FL-PROOF RS 10 J 2W FL-PROOF RS 270 J 2W FL-PROOF RS 100 J 2W SMALL-RD 1.0K J 1/2W POTENTIOMETER(5K)	E KM	
VR2		*	R10-4645-05	POTENTIOMETER(50K)		
S1 S2		*	S62-0810-05 S31-2630-05	SLIDE SWITCH SLIDE SWITCH		
D1 -9 D10 D13 -18 D19 ,20 D21 -23			1SS176 RD5.1JS(B2) 1SS176 E-152 RD8.2JS(B2)	DIODE ZENER DIODE DIODE CONSTANT CURRENT DIODE ZENER DIODE		
D24 D25 ,26 D27 D28 D29 ,30			E-152 RD20JS(B) 1SS176 RD5.1JS(B2) E-152	CONSTANT CURRENT DIODE ZENER DIODE DIODE ZENER DIODE CONSTANT CURRENT DIODE		
D31 ,32 D33 D34 D35 -37 D40			RD8.2JS(B2) 1SS176 RD5.1JS(B2) 1SS176 RD8.2JS(B2)	ZENER DIODE DIODE ZENER DIODE DIODE ZENER DIODE		
IC1 -3 IC4 ,5 IC7 ,8		*	NJM5532D-D NJM4565D-D UPA68H	IC(OP AMP X2) IC(OP AMP X2) DUAL FET		

E: Scandinavia &amp; Europe K: USA P: Canada W: Europe

U: PX(Far East, Hawaii) T: England M: Other Areas

UE: AAFES(Europe) X: Australia

⚠ indicates safety critical components.

## PARTS LIST

× New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
Q1 ,2			2SD1302(S)	TRANSISTOR		
Q3 -6			2SC945(A)(Q,P)	TRANSISTOR		
Q7 -10			2SA733(A)(Q,P)	TRANSISTOR		
Q11 -16			2SC2632(Q,R,S)	TRANSISTOR		
Q17 ,18			2SA1124(Q,R,S)	TRANSISTOR		
Q19			2SD1266BD	TRANSISTOR		
Q20			2SB941BD	TRANSISTOR		
Q21			2SC1845(F,E)	TRANSISTOR		
Q22			2SA992(F,E)	TRANSISTOR		
Q23			2SA1110(Q,R)	TRANSISTOR		
Q24			2SC2632(Q,R,S)	TRANSISTOR		
Q25 ,26			2SC945(A)(Q,P)	TRANSISTOR		
Q27			2SD1266BD	TRANSISTOR		
Q28			2SB941BD	TRANSISTOR		
Q29			2SC945(A)(Q,P)	TRANSISTOR		
Q30			2SA733(A)(Q,P)	TRANSISTOR		
Q31			2SC945(A)(Q,P)	TRANSISTOR		
Q32 -34			2SA733(A)(Q,P)	TRANSISTOR		
<b>DAUGHTER (X89-1450-10)</b>						
-			J13-0070-05	FUSE HOLDER		

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U: PX(Far East, Hawaii) T: England M: Other Areas

UE: AAFES(Europe) X: Australia

⚠ indicates safety critical components.

## SPECIFICATIONS